

IAF/IAA SPACE LIFE SCIENCES SYMPOSIUM (A1)  
Human Physiology in Space (2)Author: Prof. Philippe ARBEILLE  
FranceMrs. Danielle Greaves  
University of Waterloo, Canada  
Dr. Richard Hughson  
University of Waterloo, CanadaASSESSMENT OF ARTERIAL WALL STRUCTURE USING ULTRASOUND RADIO FREQUENCY  
PROCESSING. COMPARING DRY IMMERSION AND SPACEFLIGHT.**Abstract**

Background: Ultrasound radio frequency (RF) was used to quantify changes in structure of the common carotid artery (CCA) wall after four days of dry immersion (DI) and compare with the results obtained after six months of microgravity. The hypothesis was that structural changes in each insonated target will be quantifiable using an ultrasound coefficient of reflectivity (R). Method: The R for anterior and posterior CCA, sternocleidomastoid muscle, intima layer and CCA lumen were calculated from the RF data displayed along 5 vertical ultrasound lines selected in the B mode image. Results: After four days of DI, the R coefficient increased in the posterior wall of the CCA (+15Conclusion: The coefficient of reflectivity (R) may be a useful new marker of tissue-level structural changes, a tool that may provide complementary information alongside previously observed wall thickness and stiffness changes occurring in the CCA.

Reference: - Arbeille P, D greaves, D Chaput, A Maillet, R Hughson. Index of Reflectivity of ultrasound radiofrequency signal from the carotid artery wall increases in astronauts after a 6-month spaceflight. Ultrasound Med Biol . 2021. May 14;S0301-5629(21)00149-6. doi: 10.1016/j. ultrasmedbio. 2021.03.028.